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IS 2523 (1982): Wool Hose Tops [TXD 10: Hosiery]

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Indian Standard

SPECIFICATION FOR WOOL HOSE TOPS

(First Revision)

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SPECIFICATION FOR WOOL HOSE TOPS

(First Revision)

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Indian Standard

SPECIFICATION FOR WOOL HOSE TOPS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 15 February 1982, after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

0.2 This standard originally published in 1963 has been revised to specify the particulars of grade of wool tops. In this revision the requirements in respect of scouring have been replaced by scouring loss.

0.3 Hose tops are short lengths of rib knit tubular fabrics which are worn over the socks to cover the legs.

0.4 Standards of Weights and Measures Act, 1976 stipulates the use of International System of Units in the country; in order to familiarize the industry with this system the recommended SI units for use in the textile industry are given in Appendix B.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the constructional details and other particulars of wool hose tops dyed or of mixture shades.

1.2 This standard does not specify the design, type of finish, general appearance, lustre and feel of wool hose tops (*see also* **5.5**).

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*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 3596-1967* shall apply.

3. MATERIALS

3.1 Yarn – The yarn used in the manufacture of the hose tops shall be spun on worsted system from wool only or blends of wool, nylon and viscose rayon in the proportion as agreed to between the buyer and the seller. The wool tops shall not be of less than 48s grade (*see* Note 1). The count of yarn shall be approximately 85 tex × 2 (Nm 11/2) and shall have a minimum single thread breaking load of 7 850 mN (800 gf) (*see* Notes 2 and 3).

NOTE 1 — Specification for 48 s grade wool tops shall conform to IS : 5911-1977†.

NOTE 2 — The breaking load of yarn shall be determined on a test length of 500 mm using a constant rate of traverse type machine at a rate of traverse of 300 ± 15 mm per minute.

NOTE 3 — The breaking load value of yarn removed from knitted fabric shall not be less than 95 percent of the specified value.

4. MANUFACTURE

4.1 The hose tops shall be tubular and well-knitted in 1 × 1 rib stitches. The knitting should neither be too tight nor too loose. The loops at the two edges of the hose tops shall be secured so as to prevent unravelling by:

a) a four-course welt made either in one step or in two steps of two courses each at the top edge, and

b) locking at the bottom edge.

4.2 The hose tops shall be white or dyed to the required shade.

5. REQUIREMENTS

5.1 Dimension and Mass — The hose tops shall conform to the requirements of Table 1.

5.2 The hose tops shall also conform to the requirements given in Table 2.

5.3 Fibre Composition — The fibre composition of the knitting yarn used in the manufacture of hose tops shall be as agreed to between the buyer and the seller. However, a tolerance of $^{+1}_{-2}$ on the numerical values of the contents in percentage of fibre other than wool shall be permitted. Balance percentage content shall be that of wool.

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*Glossary of terms relating to hosiery.

†Fineness grades of wool tops (*first revision*).

NOTE — In case of hose tops manufactured from 70 : 15 : 15 blend of wool, nylon and viscose rayon, the percentage of nylon and viscose rayon shall be 13 to 16 and the balance shall be wool.

TABLE 1 DIMENSIONS AND MASS OF HOSE TOPS

(*Clause* 5.1)

SIZE NO.	LENGTH	WIDTH	MASS PER 10 PAIR, *Min*	TOTAL NUMBER OF WALES
(1)	(2)	(3)	(4)	(5)
	cm	cm	g	
1	45	6·0	1 100	80
2	45	6·5	1 160	84
3	50	6·0	1 240	80
4	50	6·5	1 300	84
5	55	6·0	1 380	80
6	55	6·5	1 440	84
Tolerance, percent	+ 1	± 0·5	—	—
Method of Test	A-2	A-2	A-3	A-4

NOTE — A tolerance of — 5 percent shall be permissible on the average mass of individual pair, provided the minimum collective mass is maintained as specified above.

5.3.1 In case of wool-nylon hose tops, the blend composition, that is, amount of wool and nylon shall be determined according to IS : 2006-1978*. While in case of wool-nylon-rayon hose tops the percentage of wool-fibres shall be determined according to IS : 2006-1978* and the percentage of nylon fibres in the residue according to IS : 2005-1962†. The percentage of viscose rayon fibres shall be calculated by the formula:

$$Z = 100 - (X + Y)$$

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*Mothod for quantitative chemical analysis of binary mixtures of protein fibres and certain other fibres (*first revision*).

†Method for quantitative chemical analysis of binary mixtures of polyamide fibres and certain other fibres.

where

X, *Y* and *Z* are the percentages of the wool, nylon and rayon fibres respectively.

NOTE — The fibres present in the yarn should first be identified according to the method prescribed in IS : 667-1955*. The sample to be analysed should be free from added and non-fibrous materials.

TABLE 2 REQUIREMENTS OF HOSE TOPS

(*Clause* 5.2)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST
i)	Courses/dm	44 ± 2	A-4
ii)	Grade of wool tops	Not less than 48s	IS : 5911-1977*
iii)	Dimensional change (due to relaxation), percent, *Max*:		A-5
	leg portion	3·0	
	foot length	2·5	
iv)	*p*H value of acqueous extract	5·0 to 7·5	IS : 1390-1961†
v)	Scouring loss, percent, *Max*	4·0	A-6
vi)	Colour fastness to:		
	a) Light	4 or better	IS : 686-1957‡ or IS : 2454-1967§
	b) Washing: Test 2	4 or better	IS : 3361-1955‖
	c) Perspiration	4 or better	IS : 971-1956¶
	d) Rubbing	4 or better	IS : 766-1956**

NOTE — In case of dispute, colour fastness to light shall be determined by IS : 686-1957‡.

*Fineness grades of wool tops (*first revision*).

†Methods for determination of *p*H value of aqueous extracts of textile materials.

‡Methods for determination of colour fastness of textile material to daylight.

§Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

‖Method for determination of colour fastness of textile materials to washing: Test 2.

¶Method for determination of colour fastness of textile materials to perspiration.

**Method for determination of colour fastness of textile materials to rubbing.

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*Simple method for identification of common commercial textile fibres.

5.4 The hose tops shall be free from objectionable flaws. The objectionable flaws shall be those which strike immediately the eyes and shall be deemed to include:

a) noticeable broken thread in the body;

b) large mends;

c) ladders;

d) dropped stitches;

e) noticeable oil or other stains;

f) holes, cuts or tears extending beyond 6 mm square in area;

g) uneven dyeing;

h) streakiness; and

j) any other defect which may significantly mar the appearance or serviceability of hose tops.

5.5 Sealed Sample — If, in order to illustrate or specify the indeterminable characteristics, such as, general appearance, finish, shade and feel of hose tops a sample has been agreed upon and sealed, the supply shall be in conformity with the sealed sample in such respects.

5.5.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

6. PAIRING

6.1 The hose tops shall be matched and paired according to their shade and size. A tolerance of ± 15 mm on the length of the hose tops shall, however, be permissible while pairing.

7. MARKING

7.1 Each pair of the hose tops shall be marked with indelible ink with the following:

a) Name of the material, namely, Wool Hose Tops;

b) Fibre blend of composition in the descending order;

c) Size;

d) Manufacturer's name, initials or trade-mark; and

e) Any other information as required by the buyer.

7.1.1 The hose tops may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may by granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PRESERVATION

8.1 The hose tops shall be preserved with naphthalene using a minimum quantity of five kilograms per cubic metre of the bale or case.

9. PACKING

9.1 The hose tops shall be packed according to IS : 3353-1966* or IS : 2518-1964† as the case may be.

9.2 Alternatively, the hose tops may be packed by the method given below, when specifically agreed to between the buyer and the seller.

> Each pair of tops shall be properly folded and 10 such pairs of the same size and shade, suitably preserved, shall be tied at 2 places with 3 ply jute twine or equivalent string to form a bundle. Twenty-five bundles (250 pairs) shall then be arranged and wrapped with an inner layer of polyethylene film of 40 microns thickness (*see* IS : 2508-1977‡) or kraft paper conforming to Grade 2 of IS : 1397-1967§ and outer layer of heavy cee cloth (*see* IS : 3751-1966||) or equivalent hessian to form into a bale of rectangular shape. The bale shall be well pressed and made as compact as possible. The overlap of the inner layer shall be at least 10 cm to ensure full protection of the contents of the bale. The overlap of the outer layer shall be such that it can be appropriately and securely sewn around the bale. The outer layer of bale shall be stitched with 2 strands of 3 ply jute twine with at least 12 stitches/dm, taking care not to pierce the inner wrapping during stitching. The

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*Code for inland packing of wool hosiery yarn and goods.

†Code for seaworthy packaging of wool hosiery yarn and goods.

‡Specification for low density polyethylene films (*first revision*).

§Specification for kraft paper (*first revision*).

||Specification for heavy cee cloth.

bale shall then be bound with at least two hoops of metal strip or wire in each direction around the length and width of the bale The gross mass of the bale shall be approximately 37 kg.

9.3 In order to ensure safety and prevent pilferage of the contents of the bale during transit and storage, the following precautions shall be taken at the time of packing:

a) Each hoop of metal strip shall be in one piece and the ends shall be sealed with a banding machine or securely rivetted, and where banding machine is not available, the bales shall be properly and securely bound with wire.

b) The bale shall be bound with additional hoops of metal strip or wire if the dimensions of the bales exceed 60 cm in any of the directions so that no two hoops are more than 25 cm apart.

c) The seams of the bales shall be dammered with indelible ink or paint.

10. SAMPLING

10.0 The sampling procedure given below shall give desired protection to the buyer and the seller provided the lot submitted for inspection is homogeneous. To achieve this the manufacturer shall maintain a system of process control at all stages of manufacture and shall ensure that the hose tops tendered by him for inspection comply with the requirements of this standard in all respects.

NOTE — For effective process control, the use of statistical quality control techniques is recommended and a helpful guidance may be obtained in this respect from IS : 397*.

10.1 Lot — In any consignment all pairs of the hose tops of the same composition, colour and size shall be grouped together to constitute a lot.

10.1.1 The conformity of a lot to the requirements of this standard shall be determined on the basis of the tests carried out on the sample selected from it.

10.2 Unless otherwise agreed to between the buyer and the seller, the number of pairs of tops depending upon the size of the lot, shall be selected at random in accordance with col 2 of Table 3.

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*Method for statistical quality control during production:

(Part I)-1972 Control charts for variables (*first revision*).

(Part II)-1975 Control charts for attributes and count of defects (*first revision*).

TABLE 3 NUMBER OF PAIRS OF HOSE TOPS TO BE SELECTED FROM A LOT AND PERMISSIBLE NUMBER OF NON-CONFORMING PAIRS

(*Clauses* 10.2 *and* 10.3)

NUMBER OF PAIRS IN THE LOT	NON-DESTRUCTIVE TESTING		DESTRUCTIVE TESTING	
	Number of Pairs to be Selected	Permissible Number of Non-conforming Pairs	No. of Pairs to be Selected	Permissible No. of Non-conforming Socks
(1)	(2)	(3)	(4)	(5)
Up to 50	10	1	2	0
51 ,, 100	20	2	2	0
101 ,, 200	30	3	2	0
201 ,, 300	40	3	3	0
301 ,, 500	50	4	5	0
501 ,, 800	70	6	7	1
801 ,, 1 300	110	8	10	1
1 301 ,, 3 200	150	10	15	1
3 201 and above	220	14	30	3

10.3 The sample size and the criterion for conformity for various characteristics shall be as follows:

Characteristics	*Sample Size*	*Criterion for Conformity*
Dimensions and freedom from defects	All the pairs selected according to col 2 of Table 3	Non-conforming pairs not to exceed the corresponding number given in col 3 of Table 3
Mass	All the pairs selected according to col 2 of Table 3	Each observed value to satisfy the specified requirement
Specification for wool tops, dimensional change (due to relaxation), *p*H value scouring loss, colour fastness to various agencies except light	One hose top from each pair selected according to col 4 of Table 3	Non-conforming tops not to exceed the corresponding number given in col 5 of Table 3
Colour fastness to light	One sock up to 500 pairs and two above that	Each observed value to satisfy the specified requirement

APPENDIX A

(*Tables* 1 *and* 2)

METHOD OF TEST

A-1. CONDITONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

A-1.1 The test specimen shall preferably be conditioned for testing and tested in the standard atmosphere as given in IS : 6359-1971*.

A-2. DIMENSIONS

A-2.1 Procedure — Take each top from the test sample. Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting the specimen. Measure correct to the nearest 5 mm, the dimensions given in Table 1.

A-3. MASS

A-3.1 Procedure — Take a set of 10 pairs of tops from the test sample (*see* **10.3**). Condition them to moisture equilibrium for 24 hours (*see* **A-1.1**) and weigh them to an accuracy of 10 g. Also determine the mass of individual pair of socks.

A-4. WALES AND COURSES PER DECIMETRE

A-4.1 Procedure — Take one of the tops from the test sample (*see* **10.3**) and lay it flat on a table. Remove all creases and wrinkles without distorting it. Count with the help of pick glass or a magnifying glass the total number of wales and courses per decimetre of the fabric at 5 places and determine the average.

A-5. DIMENSIONAL CHANGE DUE TO RELAXATION

A-5.1 Apparatus

A-5.1.1 *Watertight Tray* — of a suitable size, at least 100 mm deep.

A-5.1.2 *Graduated Steel Rule*

A-5.2 Marking of Test Specimens — Mark on each test specimen by means of indelible ink or fast-dyed cotton sewing thread, two points *X* and *Y* such that they are the same wale.

NOTE — The colour of the indelible ink or sewing thread shall be in contrast with that of the top so that it is easy to measure the distances.

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*Method for conditioning of textiles.

A-5.3 Procedure

A-5.3.1 Take one of the tops from the test sample (*see* **10.3**). Place the specimen on a glass plate. Remove carefully all wrinkles and creases without distorting the specimen. Place another glass plate on the specimen. Measure correct to the nearest millimetre, the distance between X and Y.

A-5.3.2 Soak the specimen, laying it flat under a head of 25 mm of water at room temperature for 2 hours in the watertight tray. At the end of this period, without removing the specimen, drain the water from the tray and dry the specimen on a flat surface. Condition the specimen again in the standard atmosphere for 24 hours (*see* **A-1.1**).

NOTE — Wetting agent may be added to the water in the tray while soaking the specimen.

A-5.3.3 Measure again, correct to the nearest millimetre, the distance between X and Y.

A-5.4 Calculation — Calculate, correct to one place of decimal, the percentage dimensional change between the points X and Y by the formula given below:

$$\text{Dimensional change, percent} = \frac{100\,(a - b)}{a}$$

where

a = distance between the two points X and Y before soaking, and

b = distance between the same points after soaking.

A-6. SCOURING LOSS

A-6.1 Test Specimen — Cut about 10 g of the fabric from each test sample (*see* **10.3**). This shall constitute a test specimen.

A-6.2 Procedure

A-6.2.1 Dry the test specimen to a constant mass in the drying oven at 105 ± 3°C and determine its mass accurately.

NOTE — Constant mass shall be deemed to have been reached if the difference between any two successive weights at an interval of 20 minutes is less than 0·05 percent.

A-6.2.2 Extract the test specimen with a mixture of benzene and methyl alcohol for four hours at the rate of traverse of 5 extractions per hour taking care to place the specimen in a thumble and covered with cotton wool previously extracted with the above said mixture of benzene and methly alcohol, the solvent shall then be distilled off from the extract. Dry the residue to a constant mass (*see* Note *under* **A-6.2.1**) at 105 ± 3°C and determine its mass accurately.

A-6.3 Calculation — Calculate the scouring loss by the formula given below:

$$\text{Scouring loss, percent} = 100 \frac{a}{b}$$

where

a = mass of the dry residue (*see* **A-6.2.2**), and

b = mass of the specimen before extraction (*see* **A-6.2.1**).

APPENDIX B

(*Clause* 0.4)

RECOMMENDED SI UNITS FOR TEXTILES

Sl No.	*Characteristic*	*SI Unit*		*Application*
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
1.	Length	Millimetre	mm	Fibres
		Millimetre, centimetre	mm, cm	Samples, test specimens (as appropriate)
		Metre	m	Yarns, ropes, cordage, fabrics

Sl No.	*Characteristic*	*SI Unit*		*Application*
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
2.	Width	Millimetre	mm	Narrow fabrics
		Centimetre	cm	Other fabrics
		Millimetre, centimetre	mm, cm	Samples, test specimens (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, *DURRIES* (as appropriate)
3.	Thickness	Micrometre (micron)	μm	Delicate fabrics
		Millimetre	mm	Other fabrics, carpets, felts
4.	Linear density	Tex	tex	Yarns
		Millitex	mtex	Fibres
		Decitex	dtex	Filaments, filament yarns
		Kilotex	ktex	Slivers, ropes, cordage
5.	Diameter	Micrometre (micron)	μm	Fibres
		Millimetre	mm	Yarns, ropes, cordage
6.	Circumference	Millimetre	mm	Ropes, cordage
7.	Threads in fabric:			Woven fabrics (as appropriate)
	a) Lengthwise	Number per centimetre	ends/cm	
		Number per decimetre	ends/dm	
	b) Widthwise	Number per centimetre	picks/cm	
		Number per decimetre	picks/dm	

Sl No.	*Characteristic*	*SI Unit*		*Application*
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
8.	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9.	Stitches in knitted fabric:			Knitted fabrics (as appropriate)
	a) Lengthwise	Courses per centimetre Courses per decimetre	courses/cm courses/dm	
	b) Widthwise	Wales per centimetre Wales per decimetre	wales/cm wales/dm	
10.	Stitch length	Millimetre	mm	Knitted fabrics, made-up items
11.	Mass per unit area	Grams per square metre	g/m^2	Fabrics
12.	Mass per unit length	Grams per metre	g/m	Fabrics
13.	Twist	Turns per centimetre Turns per metre	turns/cm turns/m	Yarns, ropes, cordage (as appropriate)
14.	Test or gauge length	Millimetre, centimetre	mm, cm	Fibres, yarns and fabric specimens (as appropriate)
15.	Breaking load	Millinewton	mN	Fibres, delicate yarns (individual or skeins)
		Newton	N	Strong yarns (individual or skeins), ropes, cordage, fabrics

Sl No.	*Characteristic*	*SI Unit*		*Application*
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
16.	Breaking length	Kilometre	km	Yarns
17.	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18.	Twist factor or twist multiplier	Turns per centimetre × square root of tex	$\text{turns/cm} \times \sqrt{\text{tex}}$	Yarns (as appropriate)
		Turns per metre × square root of tex	$\text{turns/m} \times \sqrt{\text{tex}}$	
19.	Bursting strength	Newton per square centimetre	N/cm^2	Fabrics
20.	Tear strength	Millinewton, newton	mN, N	Fabrics (as appropriate)
21.	Pile height	Millimetre	mm	Carpets
22.	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	$\text{g/m}^2\text{/mm}$ pile height	Pile carpets
23.	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/unit deformation	Fibres, yarns, strands

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1\ \text{N} = 1\ \text{kg.m/s}^2$
Energy	joule	J	$1\ \text{J} = 1\ \text{N.m}$
Power	watt	W	$1\ \text{W} = 1\ \text{J/s}$
Flux	weber	Wb	$1\ \text{Wb} = 1\ \text{V.s}$
Flux density	tesla	T	$1\ \text{T} = 1\ \text{Wb/m}^2$
Frequency	hertz	Hz	$1\ \text{Hz} = 1\ \text{c/s}\ (\text{s}^{-1})$
Electric conductance	siemens	S	$1\ \text{S} = 1\ \text{A/V}$
Electromotive force	volt	V	$1\ \text{V} = 1\ \text{W/A}$
Pressure, stress	pascal	Pa	$1\ \text{Pa} = 1\ \text{N/m}^2$

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Northern	B69, Phase VII	S.A.S. NAGAR (MOHALI) 160051	—

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
5-8-56C L. N. Gupta Marg	HYDERABAD 500001	22 10 83
R 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	4 72 92
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

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